

## Correspondence

### COMMENTS ON "THE FIRST WATERSPOUT DISCOVERED ON SATELLITE PHOTOGRAPHS"

DONALD C. GABY

10520 S.W. 45th St., Miami, Fla.

October 13, 1962

I should like to point out what I believe to be an incorrect impression given in Hubert's [1] recent article. The article states that the photographs presented were taken from Project Mercury flight MA-4, at approximately 29.5° N., 77° W., and at an altitude of 75 n. mi., on September 13, 1961. From the position and altitude given the Mercury capsule was evidently in the process of being launched at the time these photographs were taken and it had not yet attained its orbit. I understand that the perigee height for this satellite, once it did attain orbit, was 99.25 mi.

There is the implication here that photographs of such

quality and detail may be taken from satellites. No doubt this will soon be possible, but to my knowledge it has not yet been accomplished, since orbiting satellites are generally at much greater altitudes than was the system here described. I believe that it is important to reserve the term "satellite" for those objects that are actually in orbit around Earth (or another body) and to clearly distinguish those that are not.

#### REFERENCE

1. L. F. Hubert, "The First Waterspout Discovered on Satellite Photographs," *Monthly Weather Review*, vol. 90, no. 9, September 1962, pp. 382-384.

## REPLY

L. F. HUBERT

U.S. Weather Bureau, Washington, D.C.

Mr. Gaby is correct in stating that the MA-4 capsule had not yet been inserted into orbit at the time of picture taking. The pictures were taken from a height of 75 n. mi. while the orbit perigee was just under 86 n. mi. Therefore, the capsule at time of picture taking was about 10 n. mi. of altitude and about 1 min. of time short of orbit. However, MA-4 *was* a satellite (in the sense that it did attain its orbit), and I feel my semantic aberration in composing the title might be forgiven in the interest of avoiding the propensity of meteorologists to write long explanatory titles.

I would like to comment on Mr. Gaby's objection to my "implication" that such photographs can be taken from satellites. I intended more than "implication" for I have in my files more than 200 such pictures from that same flight and almost every adjacent pair can be viewed as a stereo pair! Furthermore, some of the more dramatic pictures of cumulonimbi over East Africa were taken from over 100 n. mi. altitude, nearly half an hour after orbit had been attained. I also refer readers to an excellent color reproduction of a picture from the flight published on

pages 190-191 of the *National Geographic Magazine*, vol. 121, No. 2, Feb. 1962. The latter picture was taken from an altitude of 88 n. mi. over the west coast of Africa and shows similar detail. The detail and quality has been obtained by use of a large film format (70 mm.) and recovering the film itself. The same detail would have been possible from much greater heights, a fact easily verified by examining the detail of the clouds at great distances from the camera near the horizon.

Pictures of the quality and detail of those recovered from MA-4 of course are not available from the *TIROS* satellites which transmit by television. While such detail is possible under the present state of the art, the price one would have to pay in terms of areal coverage, transmission time, and/or communication channel width is too great, in my opinion, to be contemplated for a meteorological satellite in the near future. I agree with Mr. Gaby that such detail may soon be attained but I believe it will be for some special purpose sensor such as for example, detection of locust swarms.